

RESEARCH ARTICLE

Treatment effects of 3D-printed PCL/Fe₃O₄@ZIF-8 magnetic nanocomposite on infected bone defect

Supplementary file
Table S1. Primers used for qRT-PCR assays

Gene	Forward primer sequence (5'-3')	Reverse primer sequence (5'-3')
<i>Gapdh</i>	AACCTGCCAAGTATGATGA	GGAGTTGCTGTTGAAGTC
<i>IL-6</i>	GCCCACCAGGAACGAAAGTC	ACTGGCTGGAAGTCTCTTGCG
<i>Tnf-α</i>	GGCCAATGGCATGGATCTCA	ATGGCAAATCGGCTGACGG
<i>Alp</i>	CAACGTGGCCAAGAACATCA	CCTGAGCGTTGGTGTGTGAC
<i>Runx2</i>	TACTTCGTCAGCATCCTA	CGTCAACACCATCATTCT
<i>Col1</i>	TGCTCCTACAAAGCTGTCTCC	GATGGACTCAACGGTCTCCC
<i>Ocn</i>	CTCACTCTGCTGGCCCTGAC	CACCTTACTGCCCTCCTGCTTG
<i>β-catenin</i>	GGACAAGCCACAGGATTAC	CAGTCTCATTCCAAGCCATT
<i>C-jun</i>	GCCAACCTCAGCAACTTCA	TCTGCGGCTCTTCTTCA
<i>C-myc</i>	TATCACCAGCAACAGCAGAG	CGCAACATAGGACGGAGAG
<i>Gsk-3β</i>	CCACAGGAAGTCAGTTAC	CGCAATCGGACTATGTTA
<i>Tcf-7</i>	GAAGAAGAGGCGGTCAAG	GAGCACTGTCATCGGAAG

Table S2. Surface composition (wt%) of different elements in the scaffolds, as analyzed by EDS

Elements	C	O	Fe	Zn
PCL	66.62	33.38	-	-
PCL/5%Fe ₃ O ₄ @ZIF-8	66.97	30.54	1.9	0.59
PCL/10%Fe ₃ O ₄ @ZIF-8	64.98	30.30	3.79	0.93
PCL/15%Fe ₃ O ₄ @ZIF-8	64.12	28.75	5.82	1.31

C: carbon; O: oxygen; Fe: iron; Zn: zinc

Table S3. Mechanical properties of scaffolds compared with human bone tissues

Mechanical characteristics	Compressive strength (MPa)	Elastic modulus (MPa)
PCL	13.88 ± 0.49	20.76 ± 1.17
PCL/5%Fe ₃ O ₄ @ZIF-8	16.16 ± 1.10	24.63 ± 1.60
PCL/10%Fe ₃ O ₄ @ZIF-8	18.09 ± 1.46	28.04 ± 2.48
PCL/15%Fe ₃ O ₄ @ZIF-8	21.50 ± 0.26	31.22 ± 0.98
Cancellous bone ¹	4–12	20–500
Cortical bone ¹	130–180	3000–30,000

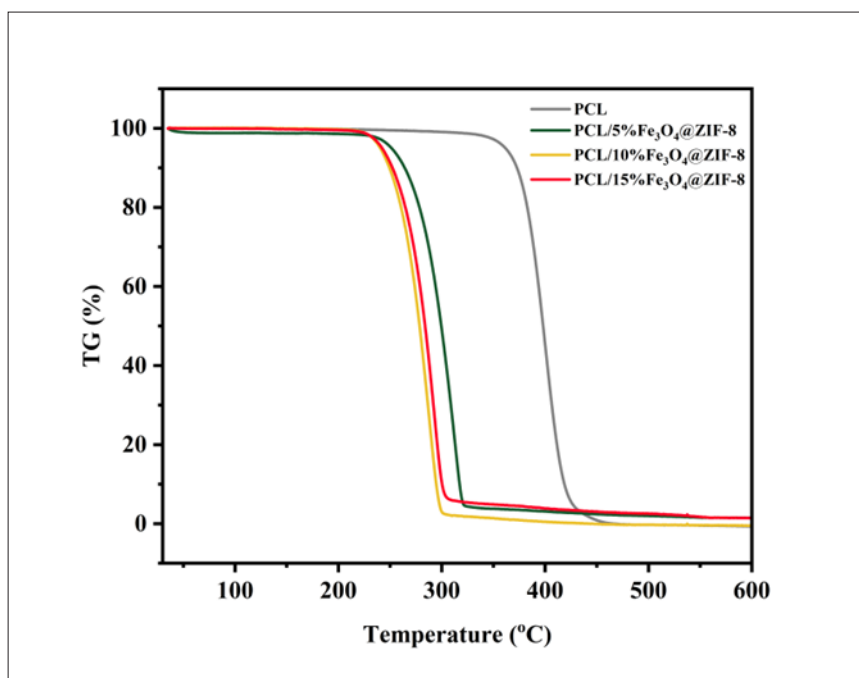


Figure S1. Thermogravimetric analysis of different scaffolds.

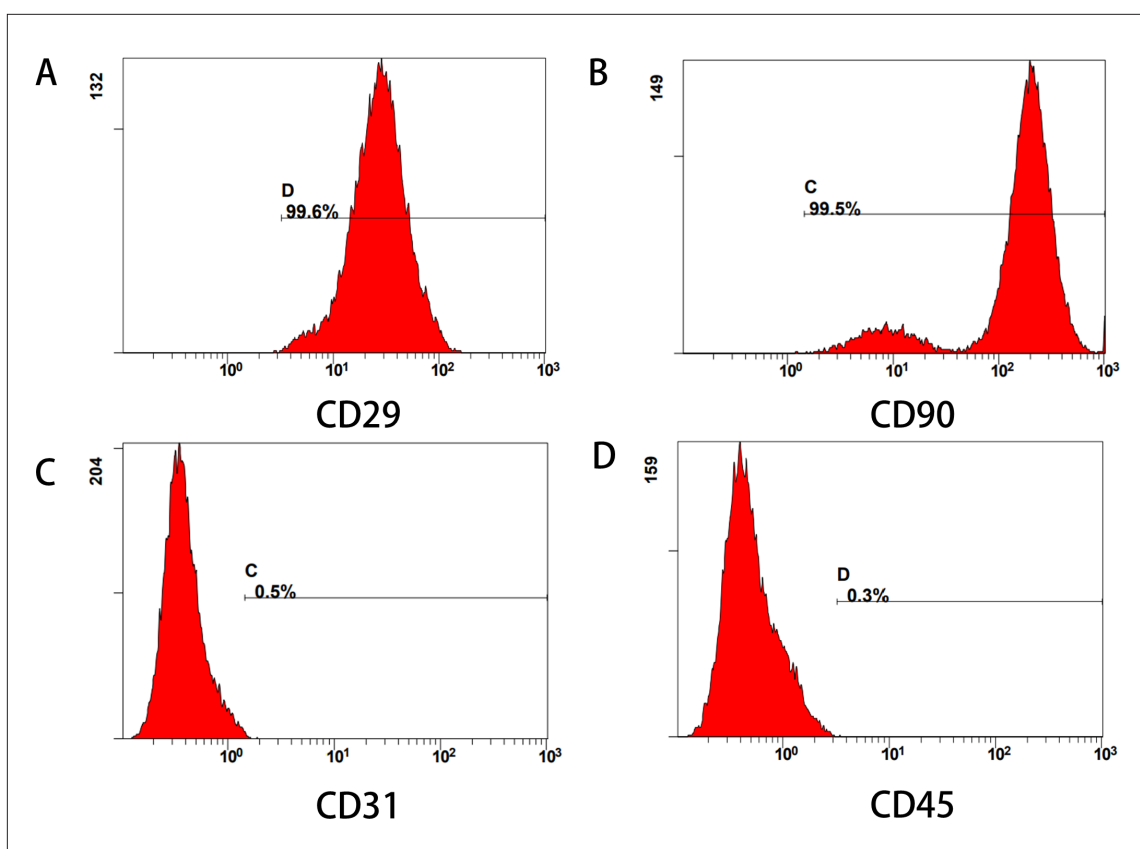


Figure S2. Cell-surface markers of cultured BMSCs detected by flow cytometry analysis.

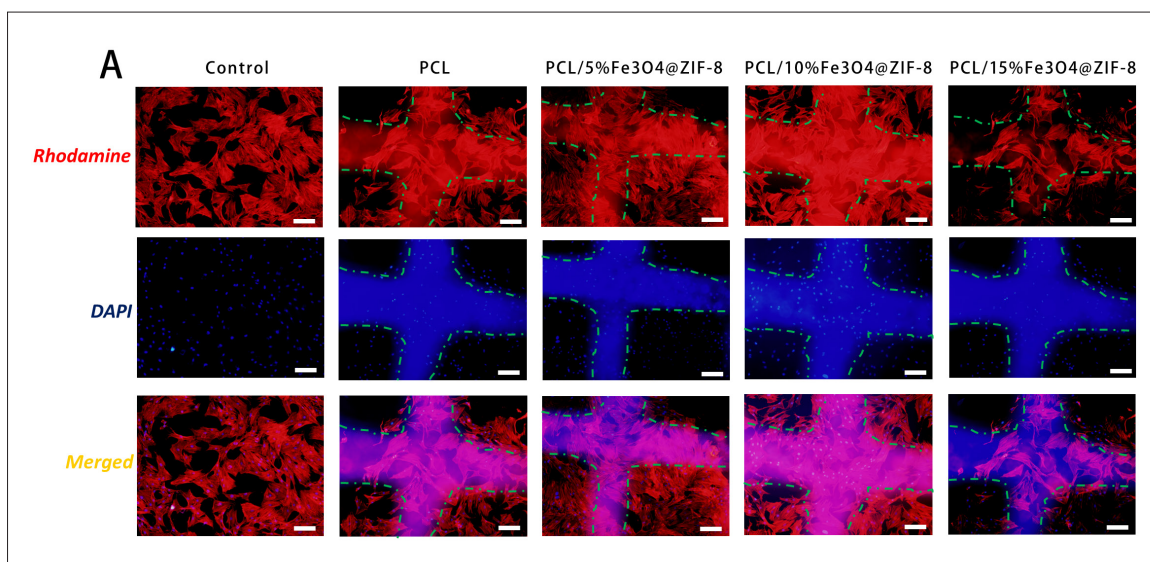


Figure S3. Fluorescence microscopy images of BMSCs after co-culturing with different scaffolds for 3 days. F-actin was stained with rhodamine (red) and nucleus with DAPI (blue) (scale bar = 100 μ m).

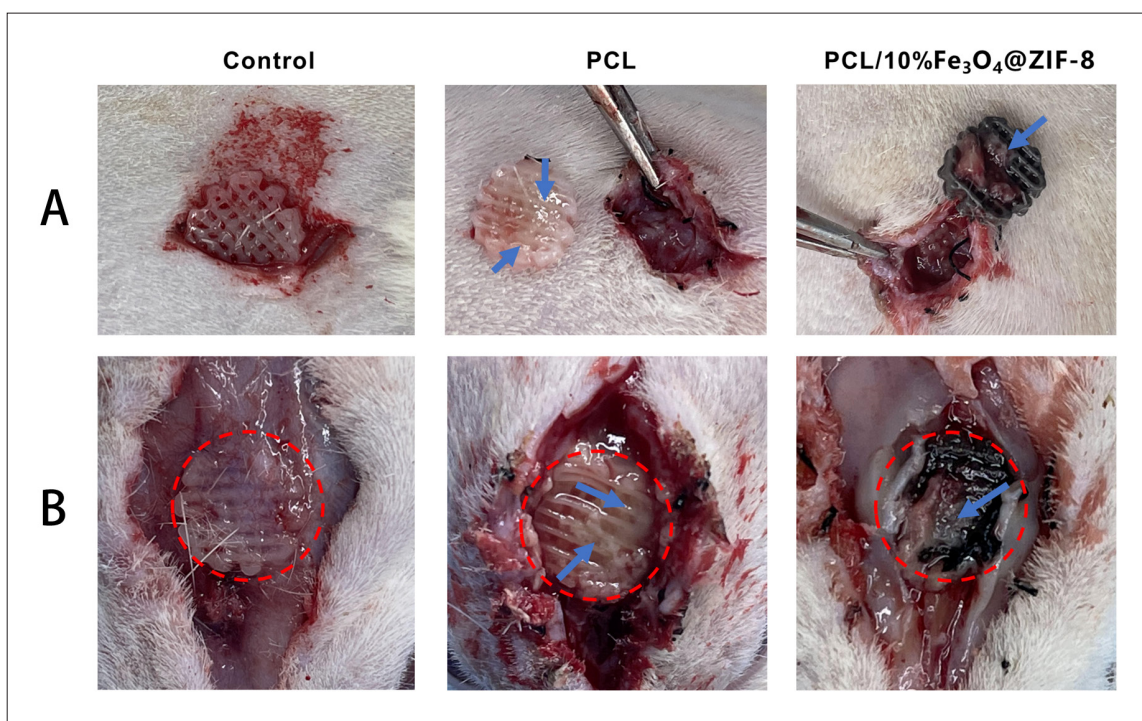


Figure S4. (A) General pictures taken 3 days after infecting rats with *Staphylococcus aureus* subcutaneously. (B) General pictures taken 1 week after the rat skull defect was infected with *S. aureus* (the blue arrow refers to pus).

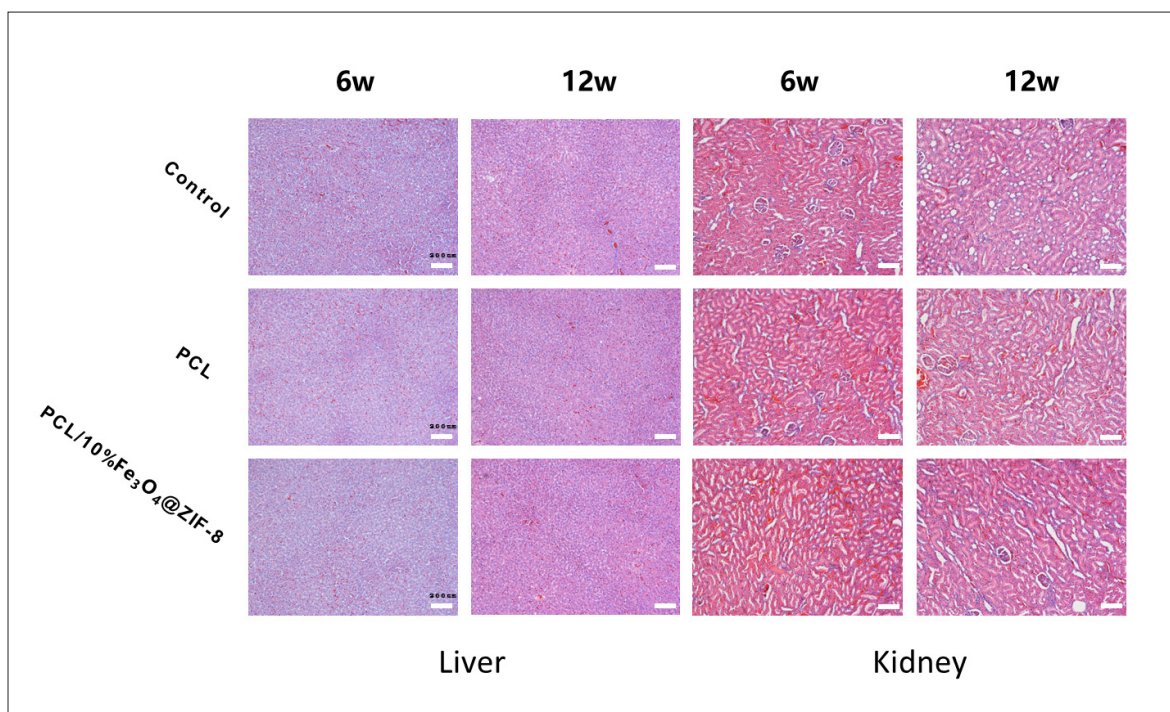


Figure S5. Biosafety assessment through H&E staining of the structure of liver and kidney (scale bar = 200 μ m).

Reference

1. Faustini M, Kim J, Jeong GY, et al. Microfluidic approach toward continuous and ultrafast synthesis of metal-organic

framework crystals and hetero structures in confined microdroplets. *J Am Chem Soc.* 2013;135(39):14619-14626. doi: 10.1021/ja4039642